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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/630,934

07/31/2003

So Suzuki

KAN 154

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23995

7590

08/20/2004

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WASHINGTON, DC 20005

EXAMINER

TOLEDO, FERNANDO L

ART UNIT

PAPER NUMBER

2823

DATE MAILED: 08/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/630,934

Applicant(s)

SUZUKI, SO

Examiner

Fernando L. Toledo

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2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 June 2004.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-5,7-12,14 and 16-20 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1,3-5,7-12,14 and 16-20 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 31 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 20040507.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 3, 5, 7 – 12, 14 and 16 – 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Wu, Chi-Hsi (U. S. patent 6,239,007 B1).

In re claim 1, Wu, in the U. S. patent 6,239,007 B1; figures 1A – 1F and related text, discloses forming first polysilicon 102 serving as a gate on a semiconductor substrate 100; forming a first insulating film 104 on the semiconductor substrate to cover the first polysilicon said first insulating film being formed to have such a thickness as to leave a difference in height around said first polysilicon (Figure 1A); forming a second insulating film 106 on the first insulating film; selectively etching the second insulating film by an etchback method until the first insulating film located on an upper surface of the gate is exposed (Column 3, Lines 5 – 10; Figure 1B); selectively etching the first insulating film located on the upper surface of the gate until the upper surface of the gate is exposed (Figure 1C); burying a space in which the first insulating film is etched, and forming a second polysilicon 108 on the second insulating film (Figure 1D); etching the second polysilicon, exposing the second insulating film, and leaving the second polysilicon in the space (Figure 1E); etching the second insulating film (Figure 1F); etching the first insulating film (Figure 1F); forming high melting point metal 110 covering the

second polysilicon; siliciding the second polysilicon by a heat treatment (Column 3, Lines 35 – 50); and removing an unreacted portion of the high melting point metal (Figure 1F).

3. In re claim 3, Wu discloses wherein the first insulating film is formed to be thinner than the first polysilicon (Figure 1A).

4. In re claim 5, Wu discloses wherein the second insulating film is formed to have such a thickness as to flatten a difference in height near the first polysilicon (Figure 1B).

5. In re claim 7, Wu discloses wherein a condition for etching the first insulating film is that the second insulating film is hardly etched (Column 3, Lines 5 – 10).

6. In re claim 8, Wu discloses wherein the second polysilicon is formed to have such a thickness as to flatten a difference in height near the space (Figure 1E).

7. In re claim 9, Wu discloses wherein the second polysilicon is undoped polysilicon (Column 3, Lines 20 – 25).

8. In re claim 10, Wu discloses wherein a dry etching method is used for etching (Column 3, Lines 15 – 20).

9. In re claim 11, Wu discloses wherein the high melting point metal is one of titanium and cobalt (Column 3, Lines 45 – 50).

10. In re claim 12, Wu discloses forming a lower gate electrode 102 of the T-type gate electrode on a semiconductor substrate; sequentially forming a first insulating film 104 and a second insulating film 106 on the lower gate electrode wherein the first insulating film is formed to have such a thickness as to leave a difference in height around the lower gate electrode (Figure 1B); selectively removing the second insulating film until the first insulating film located on the upper surface of the lower gate electrode is exposed (Column 3, Lines 5 – 10; Figure 1B);

selectively removing the second insulating film by an etchback method until the first insulating film located on the upper surface of the lower gate electrode until the upper surface of the lower electrode is exposed (Figure 1C); forming an upper gate electrode 108 of the T-type gate electrode in a space from which the first insulating film is removed (Figure 1D).

11. In re claim 14, Wu discloses wherein the second insulating film is formed to have such thickness as to flatten a difference in height around the lower gate electrode (Figure 1C).

12. In re claim 16, Wu discloses wherein a condition for removing the first insulating film is that the second insulating film is hardly removed (Column 3, Lines 5 – 10).

13. In re claim 17, Wu discloses wherein the space is formed to be wider than the lower gate electrode (Figure 1C).

14. In re claim 18, Wu discloses wherein the upper gate electrode is formed to have such a thickness as to flatten a difference in height around the space (Figure 1E).

15. In re claim 19, Wu discloses wherein a dry etching method is used for removing the first insulating film (Column 3, Lines 15 – 20).

16. In re claim 20, Wu discloses wherein the upper gate electrode is formed by etching back metal of the upper gate electrode formed on an entire surface of the semiconductor substrate to bury the space (Figure 1F).

Claim Rejections - 35 USC § 103

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

18. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wu.

In re claim 4, Wu does not clearly disclose wherein the first insulating film is formed to be thicker than the first polysilicon.

It would have been obvious to one having ordinary skill in the art at the time the invention was made wherein the first insulating film is formed to be thicker than the first polysilicon, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. Note that the specification contains no disclosure of either the critical nature of the claimed thickness or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen thickness or upon another variable recited in a claim, the Applicant must show that the chosen thickness is critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990). In addition, the selection of insulating layer thickness, is obvious because it is a matter of determining optimum process conditions by routine experimentation with a limited number of species of result effective variables. These claims are prima facie obvious without showing that the claimed ranges achieve unexpected results relative to the prior art range. *In re Woodruff*, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also *In re Huang*, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996)(claimed ranges or a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also *In re Boesch*, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in known process is ordinarily within skill or art) and

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In re Aller, 105 USPQ 233 (CCPA 1995) (selection of optimum ranges within prior art general conditions is obvious).

Response to Arguments

19. Applicant's arguments filed 10 June 2004 have been fully considered but they are not persuasive for the following reasons.

20. Applicant argues that the etching process of Wu is a planarization process and not an etchback process.

Examiner respectfully submits that Wu teaches an etchback process to etch the first and second insulating layers as it is clearly stated in column 3, lines 5 – 10 of the patent of Wu.

21. Applicant argues that Wu does not teach a dry etching process to etch the first and second insulating layers.

Examiner respectfully submits that Applicant's argument that the references fail to show certain features of Applicant's invention, it is noted that the features upon which Applicant relies (i.e., dry etching technique) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

22. Therefore the U.S.C. §102(b) rejection stands and it is considered proper.

23. Regarding Applicant's arguments that the limitations of claim 4 are not taught or are not an obvious variation of the invention of Wu. Examiner respectfully submits that the dielectric layer would be thicker than the polysilicon layer at the sides of the polysilicon layer.

24. Therefore the U.S.C. §103(a) rejection stands and it is considered proper.

Conclusion

25. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

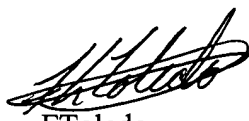
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fernando L. Toledo whose telephone number is 571-272-1867. The examiner can normally be reached on Mon-Thu 7am to 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 571-272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

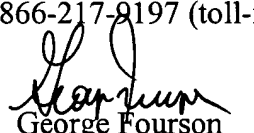
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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



FToledo

19 August 2004



George Fourson
Primary Examiner
Art Unit 2823